6 Case Studies of Using Video in Learning and Teaching

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Foreword

The six case studies presented in this document are examples of using video in learning and teaching. They were collated as part of the JISC funded project: *VideoActive* and show how video can successfully be used in a variety of learning and teaching scenarios.

The case studies are written in an informal style with discussion of both the positive and negative aspects of the authors' experience of developing and using the videos. At the end of each case study the authors have included their top "video" tips.

As well as the case studies themselves, there is a table of commentary which compares and contrasts the case studies - focusing on the motivation for developing the video, the pedagogical approach taken, the technology used and the feedback from students.

We hope that whether you've only just started thinking about using video in your teaching or whether you're already an expert that you will find the case studies a useful resource.

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Commentary

Description	Motivation	Pedagogy	Technology	Evaluation
Case study 1: 1st year Chemical Engineering; The best just got better? *Grant M Campbell, University of Manchester*				
This is a video lecture created by Grant Campbell for his 1st year Chemical Engineering undergraduate module. The video format includes talking head clips and full live lectures combined with Power Point slides, animations, tutorial questions, accompanying handouts and word documents.	Grant reveals that when a student told him that the chemical engineering degree course she was on was dull, he realised that he wanted to make his teaching more interesting. The JISC/DNER Click and Go Video project offered the opportunity to explore the use of video as a means of making the subject more appealing.	For Grant 'pedagogy comes first' and this belief has taken him into an exploration of the ways video can enhance both the learning experience of the students and his own teaching style. He now uses striking pictures as much as possible, and words on screen as little as possible. He believes in providing a variety of learning approaches to maintain the interest of the students.	This case study is an excellent example of using an integrative approach: combining video with Power Point, timed animations with Microsoft Producer and accompanying handouts as word documents. Grant has developed a CD-ROM to provide the students with copies to take home, something that was appreciated by the students.	The exam results were mediocre despite the efforts and the student enthusiasm; however, Grant's disappointment at the results has led him to think that providing ready access to such clear explanations through the video, encouraged the students to think that they understood the material. The students did not 'struggle' or wrestle enough with the topic. He plans in the future to introduce student-driven problem-based learning
Case study 2: Sign Lab, Centre for Deaf Studies, *Kearsy Cormier & Pete Carss, Centre for Deaf Studies, University of Bristol*				
SignLab is a sign language computer lab used by staff and students for teaching BSL to mostly hearing students. The students use the video to work on reception skills and film themselves signing to develop production skills.	This is an area where traditional videotapes have been used for many years. However, analogue video provides limited opportunities for interactivity (flexibility and access). The main advantage of digital video for the team was that it is easier to use and more durable than analogue video.	Whilst analogue video has been used for 25 years for language teaching, digital video has provided the potential for improving the use of video. This is an example of developers working with a tried and tested approach and pedagogy.	Panda was developed inhouse and allows for live video capture and compression at press of a button, as well as the live dubbing of audio on to pre-recorded video and vice-versa. Other technologies used include Quicktime, Mc OS X Server, and WebCams. They are planning to use a central server to store video materials and 7 client computers. They are looking into students being able to access the materials from home, but will need to address the security issues this would incur. They also found a lack of support for MACs from the University.	There were some positive responses to the technology; it was considered to be efficient and easy to use, but it was felt that more training was needed. Other problems were that some of the videos were of poor quality and there was limited access to the lab.

Description	Motivation	Pedagogy	Technology	Evaluation
Case study 3: A patient video to facilitate self study in physiotherapy, *Valerie Cooper, Robert Gordon University*				
The rational for this case study is grounded on the students' requirements; it emerged from the students requesting extra tutorials in which they could practice anatomical movements and receive feedback in preparation for their exams. Valerie's intention was to provide a self-study resource so that students would be able to practice and visualise symptoms in patients, in particular a common neurological condition.	Valerie describes how at a presentation on Question Mark Perception, the example of a video of a bird in flight embedded with associated questions, inspired her to use video in her teaching on physiotherapy. The videos attempt to simulate face to face scenarios in which students can observe, ask questions and get a reply from the tutor in situ.	Valerie argues that interaction (as described in the Three I's framework) scored highly as her project focuses on providing materials that enable not only self-study but also assessment of the students. The integration of assessment appears to be an important feature of Valerie's case study with video clips incorporated into self-assessment tests to provide interactivity. The videos serve to reinforce the student learning and test their understanding. A very useful insight from this case study is the issues around consent and the successful recruitment of real patients.	The resource comprises videos embedded within MCQs. There are no plans to deliver the package on a CD ROM due to issues on password protection and copyright. This has meant that the students have to view the video package from campus (which has brought up the problem of access to headphones) and/ or access it from home (easier now with the increased uptake of broadband).	Valerie recognises the importance of evaluation and has designed online questionnaires to capture students' attitudes to the package. Her findings indicate that the students that frequently used the package seemed to have a more consistent improvement than those that only used it once.
Case study 4: Mastering University, *Richard McCarter, Colin Beard, Alison Hudson Sheffield Hallam University*				
This case study describes the development of a CD-Rom using video recordings taken of an introductory two day course for postgraduate students. This was very much a collaborative effort of experts - bringing together curriculum development with multimedia production in a context of research based practice to develop to what is now a commercially available CD-ROM.	The inspiration was an already existing face to face postgraduate programme and the challenge was to transfer its value to an e-learning context. This meant that they needed to create an effective virtual representation of the programme, and the use of video seemed to be an appropriate technology for the project.	It is clear from the case-study that there was a real curiosity to investigate to what extent digital video can enhance the learning experience. Hence the emphasis on creating an interface and educational design for the CD-ROM that mirrors the metaphor of a learning journey. The team wanted to capture the atmosphere of the face to face situation with video. They achieved this in different ways: making the camera appear to be part of the audience, following the tutor, and recording students as they engaged with each other.		Of the three 'I's, although interactivity was rated highly by the students, integration was the most valued, with students considering the integration of video and text to be the strongest attribute to the package. They reported feeling drawn towards the text through the video element. The authors' reflection on this is that they have achieved a combination of an emotional and a cognitive experience thorough the video treatment.

Description	Motivation	Pedagogy	Technology	Evaluation
Case study 5: Study Tips Video Gallery, *Phil Marston, University of Aberdeen*				
The Video Tips Gallery created by students for students provides useful tips for study and life at university. Phil and his team wanted the students to speak directly to other students in their own terms. As he puts it 'it had to be a site by students for students, and students had to be able to choose the advice they wanted to see'.	The primary motivation was the wish to deliver a project involving video. The driver being that video offers a new and rich alternative to the way we communicate, understand and learn. There was also an identified need to provide online support for students.	The approach was to use volunteer students to star in the video clips and to employ a casual and relaxed style during filming. 'As and when' hand held shooting helped to create the relaxed atmosphere.	Phil highlights the benefits of the web delivery, user-friendly interface, user control and access, and the team's aim to do something other than 'offering little more than virtual VHS'. Understanding the appropriateness of the medium (to produce bite sized user-controllable chunks) also seems to be important to him. Phil raises the difficulties in finding an appropriate consent/release form.	Phil's ideas for evaluation are interesting as he plans to integrate it into the Video Tips Gallery so that students will be able to submit comments through a feedback button. They will also be able to contribute further tips. This is a very exciting aspect of this case study as the plan is to eventually allow students to film themselves straight onto the server.
Case study 6: Mindful learning and the design of learning sequences, *Michael O'Donoghue, Bob Kemp, Megan Shaw, Lancaster University*				
VirRAD – Virtual Radiopharmacy is a third year project with the aim of creating a virtual community for the global nuclear medicine community. The resource includes a series of video sequences demonstrating current nuclear medicine laboratory procedures in the UK. The video sequences are produced from scripts authored by expert practitioners. The videos focus on demonstrating correct operational procedures for laboratory work.	The design of the virtual community and learning resources is based on a series of questions and issues raised by Ellen Langer, referred to as *Mindful Learning* (Langer, 1997). The design challenge was to introduce Langer's ideas to the production of instructional video sequences.	The project's aim was to address Langer's ideas including: paying attention means staying focused on one thing at a time and the notion of distraction. They experimented with two distraction techniques: visual exaggeration and unexpected events.	Video clips were kept short (1-2 minutes) to assist user concentration.	The evaluation showed that most of the users found that the 2 minute video held their attention. Inclusion of exaggeration or an unexpected event in the procedural sequence may have negative learning effects.

1st year Chemical Engineering; The Best Just Got Better?

Grant M. Campbell
University of Manchester

The stimulus and opportunity to create a video-based educational package

I once heard chemical engineering described as “simply the best education ever devised”; nevertheless, one of my tutees informed me, shortly before graduating, that our degree course was dull. I teach Heat Transfer to the first year class, about 70-100 students depending on our recruitment success. It’s an important course, foundational to several courses in subsequent years and illustrative of some of the pillars of chemical engineering as a discipline. I enjoy teaching it, as it demonstrates that essential engineering skill of taking an understanding of fundamental laws of the universe (such as conservation of energy) and applying them to solve practical problems. It is also a subject students can relate to in their everyday experience, and mostly they receive the course well. I teach it, appropriately I think, by traditional lecturing and tutorial approaches, but I wondered if perhaps I could make it, not so much less dull, but even more interesting(!) by inserting some variety into the delivery through the use of video. The university’s Computer Aided Learning centre distributes a newsletter intermittently, and I spotted a note saying “Would you like to have your lectures videoed? Contact Sally…”. I’d often thought this might be fun, and soon discovered a slight string attached, that Sally was working on the JISC/DNER Click and Go Video Project and wanted me to evaluate some software that supposedly facilitated combining video with other presentation elements to create educational packages. We could never get the software to work, but at the end of this exercise I had digitised videos of two of my lectures, and had learned several helpful tips for developing video-based material for educational purposes, of which the most valuable was the exhortation that “Pedagogy comes first!” (Thornhill *et al.*, 2002).

At this point the opportunity came up to bid for funding from ExxonMobil under its remarkably enlightened Higher Education Support Scheme, in which it generously supports teaching innovations in chemical engineering departments. So I got together with a like-minded colleague, Dr Arthur Garforth who teaches first year Introduction to Chemical Reaction Engineering, and we submitted a bid to develop a video-based teaching package, which ExxonMobil kindly agreed to support. I had my two videos from the previous academic year, and I had also, as a thank-you for my efforts on the Click and Go Video Project, been invited to attend the Advanced Learning Technology (ALT) workshop held in Manchester in July 2002 on the theme “Video Streaming: A new pedagogical approach”. At this highly enjoyable meeting I had picked up two ideas in particular. Firstly, Mike O’Donoghue from Lancaster University had given an excellent presentation in which he reminded us of the power of the image, using the distinctive windows from the children’s programme Playschool to make his point, as we all immediately recognised them even though they were, for most of us, from a very distant childhood. As a result of hearing Mike, I have consciously adopted the policy in conference and other presentations of using striking pictures as much as possible, and words on my slides as little as possible. (I was delighted when attending the 2004 Networked Learning Conference in Lancaster to bump into

Mike at the coffee stand and to be able to tell him that his talk had directly affected my presentations in this way.) The second major message I took home from the Video Streaming workshop was the idea of "chunking" video clips – giving the viewer small, bite-sized clips that were easier to digest. I was stuck with my two lovingly prepared and now apparently inappropriate 50 minute lecture videos, but Arthur was starting from scratch, so we decided to take the opportunity to test the students' reaction to shorter video chunks compared with full lectures by preparing 10 minute clips of key elements of Arthur's course. For practical reasons, these were prepared "off-line" – *i.e.* not in the live lecture as I had done, but just with Arthur's talking head against a blank background, again giving a contrast to present to the students.

We were fortunate to be able to employ the excellent services of one of our recent graduates, Andy Bishop, who over the next several months combined our videos and PowerPoint™ presentations, complete with carefully timed animations, using Microsoft Producer™. Figure 1 shows a screenshot from one of my lectures.

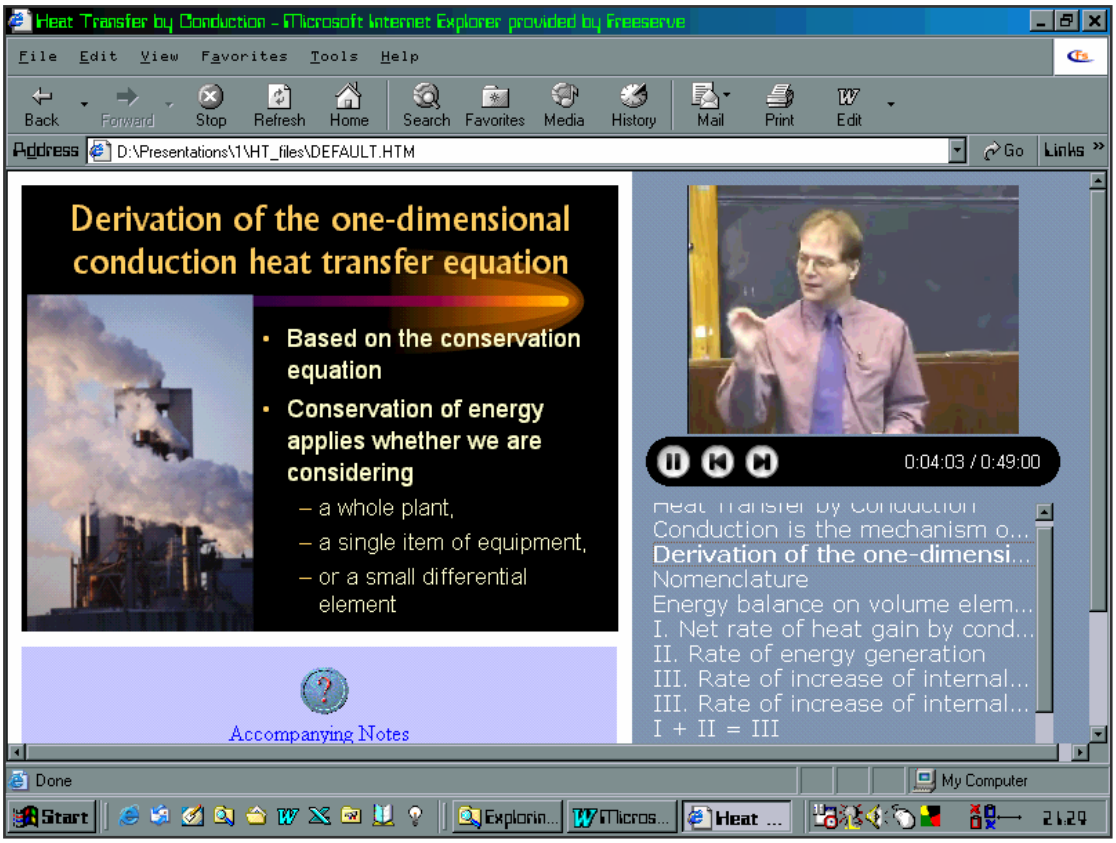

Figure 1. Screenshot from the lecture "Heat Transfer by Conduction".

Andy also prepared a web-style user interface to create a package containing my two lectures and the three clips from Arthur, a total of 125 minutes of video. Control buttons allowed the video to be played and paused or to jump to previous or subsequent slides, while a live index allowed the user to jump directly to any section of lecture. A link on my lectures opened up the accompanying handout as a Word document, while at the end of Arthur's clips a series of tutorial questions would automatically start, to encourage the students to test their understanding. The files totalled 545 MB, allowing the package to be copied onto a single CD.

The students' response

We piloted an early version of the package on several second year students who had been present during the original recording of my lectures the previous year. They gave it a very positive reception – "It's unbelievable… This is the way forward for people who prefer to learn via vision and sound"; "If it were possible to get similar learning aids for our exams this year I'm sure it'd be much appreciated!", *etc.* – and made several suggestions that were used to refine the final package. We then distributed individual CDs to each student in the first year class during March 2003. I had originally selected my two lectures as they were the two most important lectures of the course, covering topics that students find conceptually difficult (derivation and solution of conduction heat transfer equations), and I hoped students would find the opportunity to revisit spoken explanations of these concepts helpful. I also hoped that delivering the lectures using PowerPoint™ slides instead of the blackboard would give interest and variety, and maybe even enhance clarity and understanding. As noted above, I deliver the lectures with an accompanying handout, as I want the students to have as clear and comprehensive an explanation of these key topics as possible. However the handout includes blank spaces for diagrams and equations, as this ensures that students participate actively, while the action of writing down an equation reinforces the significance of each of its term. So, I presented the two lectures, then at the end of the second I gave out the CDs (and also, rather generously, a set of headphones to each student, as for obvious reasons the university computers do not have speakers attached).

A week later the students were due to sit a mid-semester test covering everything up to that point in the course, including these two lectures, so I took the opportunity at the end of the test to get the students to answer a questionnaire related to the CD package. The questionnaire and the analysis of the responses are described more fully in Campbell *et al.* (2004). The questionnaire presented several statements related to the technical quality of the CD, the usefulness of such videos in chemical engineering education, and preferences regarding the shorter clips *versus* the full lectures and the use of the blackboard *versus* PowerPoint™. The students were asked to give a score of 1-5 against each statement, where '1' indicates strong disagreement, and '5' strong agreement. In some cases an additional question such as "Why or why not?" was asked, with spaces for comments, and any further comments were invited at the end. Due to the short timescale between distributing the CDs and the test a week later, only 34 responses were received out of a class of 75, but nevertheless some clear themes emerged. Overall, the response was overwhelmingly positive, both to the quality and usefulness of the CD package itself, and to this type of initiative in general, with comments such as "CD a very good idea and very useful for revision. Hopefully we will be seeing more of these.", "Very useful tool, very impressed" and "SUPERB!!! Very helpful, I can repeat it as many times as I like". Despite this praise, the students resoundingly rejected any suggestion that the CD should replace the live lecture, for the overwhelming reason that they value the opportunity for interaction with the lecturer.

The highest scores related to two themes: the quality of the CD package, and the perceived usefulness of videoed material in chemical engineering courses. The next highest score related to the statement "If videos of lab experiments were available, I would use them". (The one student who scored a 1 against this statement gave the reason "Ruins the excitement, ha ha ha".) Despite this risk, Arthur and I, along with our colleagues Dr Philip Martin and Dr Ted Roberts, submitted a further successful funding bid to ExxonMobil to develop video-based material for laboratory classes, which we are currently doing.

The students did indicate a slight preference, on average, for the shorter clips rather than the full 50 minute lectures, although over a third of students scored this a neutral 3, with many commenting that both formats were useful. Overall the students gave a very slight thumbs down to the statement "I find lectures given using the blackboard better than live lectures using PowerPoint presentations", but with a wide range of responses. Those who favoured lectures delivered with the aid of PowerPoint™ presentations felt that the material was more clearly organised and more visually interesting. Those who favoured the blackboard gave reasons such as "when you copy things off the blackboard you take them in more", and also found the pace of lectures in which material is written on the blackboard easier. Students responding more neutrally felt that "both have good and bad points" and that "A good balance of the two is preferred". The range of responses and comments indicates that students appreciate variety, both to maintain interest and because individuals learn differently. "PowerPoint gives variety rather than the same old chalk scratching on blackboard" – however "PowerPoint can be boring as we won't be copying much stuff" (*sic*).

Conclusions, outcomes and reflections

In the 2003-2004 academic year I again took the opportunity to get feedback from the students via a similar questionnaire, confirming the main findings from the previous year. The strong message is that variety is essential, for several reasons: to capture students who learn in different ways; to cultivate the ability to learn via mechanisms that are not ones strong preference; and, most importantly, to maintain interest. There is no single right or best way of teaching or learning. A philosophy of education that seeks to pander to individual preferences overlooks both the necessity to be able to learn via more than just a few preferred routes, and the fact that variety maintains interest.

Thanks to the funding from ExxonMobil, the support from the Click and Go Video Project, the excellent work of Andy Bishop and the effective collaboration between Arthur and myself, the project was a great success, producing a high quality, coherent and integrated package that the students responded to with great enthusiasm and appreciation. On the crest of this success, we were anticipating impressive results come exam time. I included several questions in my exam specifically related to the conduction heat transfer material on the CD, and I looked forward to celebrating the successful education of the students about this important but difficult topic. I was therefore disappointed that, despite our efforts and the students' enthusiasm, the exam results were mediocre at best. I am left with a niggling suspicion that in trying to make these topics easier by providing ready access to such clear explanations, I allowed the students to delude themselves into thinking they understood the material. It is very different following someone else's explanation compared with trying to explain something yourself. In alleviating the intellectual struggle for the students, I may have inadvertently lessened their learning.

But at least they found it less dull!

Future plans

As noted above, the students indicated that videoed material related to laboratory classes would be helpful. The vast majority of students indicated that they would use the video before the experiment, so as to understand what they were doing in terms of experimental procedures and safety. Several also felt it would be

useful for reviewing after the lab. On the basis of this feedback, my colleagues and I are currently working on creating a video-based laboratory class package, supported through another ExxonMobil award. In addition to the benefits identified by the students, this will allow us to expose them to a greater range of laboratory activities – for example, to experiments too hazardous or equipment too costly to provide otherwise. The activity will relate to the 2nd Year class in Chemical Reaction Engineering, but will also touch on material from the Heat Transfer course and from another 1st Year course, Process Engineering Fundamentals, to encourage integration of understanding across different courses. This project has potentially greater scope than the previous one, but has extra dimensions of complexity that are proving challenging to address; for example, we encourage a student-driven problem-based learning approach to our lab class activities, so the package must not be too linear and prescriptive. Nevertheless, we are confident that adding such a package to our laboratory programme will again enhance the variety and interest of the course, and will demonstrate the potential and benefits of this type of teaching and learning resource.

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About the Author

Dr Grant Campbell is a Senior Lecturer in the School of Chemical Engineering and Analytical Science at the University of Manchester, and is the School's Director of Assessment. His background and research interests are in food process engineering, specifically cereals processing including flour milling, aeration aspects of breadmaking, and novel uses of cereals. Thermal processing is important throughout the food and chemical industries; mastery of Heat Transfer is therefore essential for process engineers, hence the existence of this course in the 1st year Chemical Engineering programme. Grant also teaches several laboratory classes and an MSc course in Cereal Biotechnology.

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Grant's Top Tips

1. **Manage the struggle!** That is my definition of lecturing. Learning is an intellectual struggle – students must wrestle with a subject in order to master it – and the job of a lecturer is to "manage the struggle". The job of the lecturer is not to remove the struggle or to attempt to make learning easy – to do so is to deny the student the process of learning. The lecturer must ensure that the learning is a struggle, but a struggle that the student can win This is not an excuse for poor lecturing, as it takes a great deal of perception, sensitivity and skill to construct effective educational experiences that manage the learning in this way. But it is a guard against the temptation or pressure to teach "too well" or to attempt to be too kind through, for example, the provision of videos of lectures, as we did.

   Similarly, do not provide the material in an unstructured, optimistic, unmanaged way. As Thornhill et al. (2002) note "Educational video is not a type of incidental learning, the learning still needs to be organised as part of an externally guided, deliberate learning experience".

2. **Monitor the activity.** In developing innovative teaching and learning aids, take the opportunity to get qualitative and quantitative feedback from the students, simply because it is fascinating and insightful.

3. **Build the resource base as you go along**. Creating an integrated and coherent package such as the one described here can be prohibitively burdensome if done all in one go against a tight schedule, and is an investment of time the busy academic can seldom justify. But to develop the PowerPoint™ slides and prepare a video clip one year, and another the next, and a few multiple-choice questions one afternoon, is manageable and even a welcome distraction that prevents both course and lecturer from becoming stale. Then, when time and chance allow, the bank of material is ready and available for the creation of an educational package.

4. **Engage with the literature,** and with the community of practitioners. Most of us have a lecturing style based on instinct, prejudice and flawed example (although fortunately, as noted above, slightly flawed lecturing is an essential part of learning!). The development of e-learning has brought into sharp and urgent focus the issue of how little we actually know about how people learn, whether by traditional methods or through the use of modern technology. In developing innovative teaching tools based on technology, it is easy to fall into any number of pedagogical pitfalls that will make your efforts positively counterproductive. More positively, engaging in such an exercise is an opportunity to think more deeply and read more widely about applied educational theory. Thinking through and discussing how students learn, and therefore how a learning experience that utilises video should be constructed, will have knock-on benefits for the rest of your teaching.

Videoactive Case Study Publication: SignLab

Kearsy Cormier & Pete Carss
Centre for Deaf Studies, University of Bristol

Our case study is about the SignLab at the Centre for Deaf Studies (University of Bristol) The SignLab is a sign language computer lab used by staff and students for teaching British Sign Language (BSL) to (mostly hearing) students. The lab is also used for teaching sign language interpreting.
The SignLab allows students to watch digital video to work on reception skills. Students are able to film themselves signing, for development of production skills. The software we use (Panda), developed exclusively at CDS, allows for live video capture and compression at the press of a button. This facilitates autonomous learning, as the software is so easy to use that students can watch and record video by themselves.

Reason for the project

Sign language teaching poses challenges not normally encountered with most language teaching situations. As visual languages, sign languages such as BSL cannot be easily transcribed or written. Instead, sign language teaching relies heavily on video technology. Indeed within the last 25 years, analog video has been very useful because it allows students and teachers to record sign language use and play it back again for study and review. However, analog video certainly has its disadvantages: videotapes wear out, get lost, are cumbersome to copy, and can be difficult to navigate with precision.

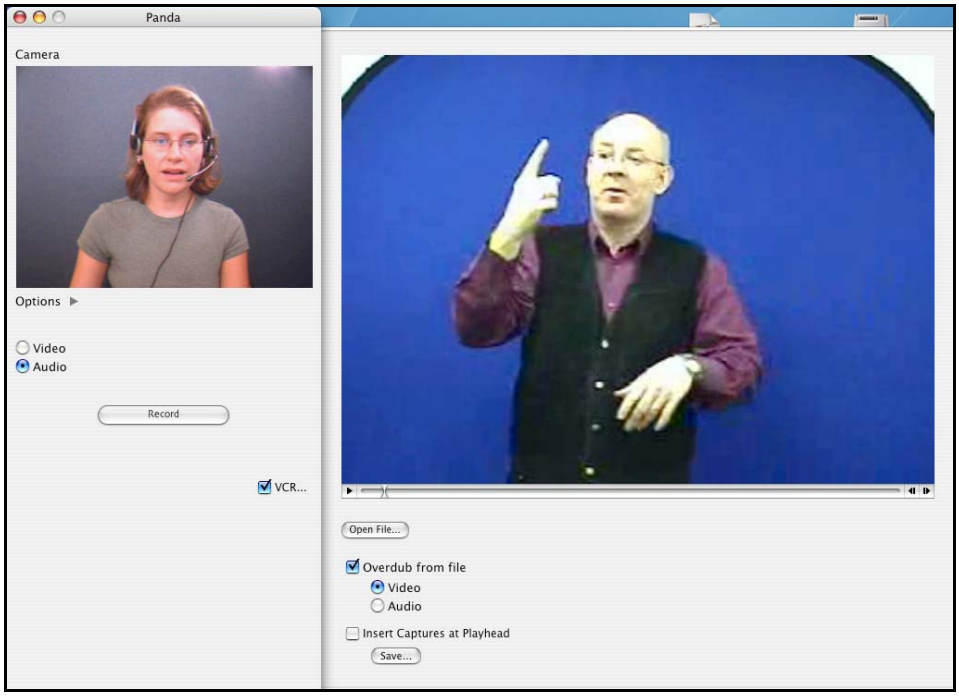
CDS staff and students have been frustrated by these difficulties for a long time. With the arrival of digital video technologies, we felt there was potential for enormous improvement. I had some knowledge of digital video technologies (I have used some video editing packages for my sign linguistics research), plus at the time we had several research staff on hand who were programmers and knew about these technologies. Digital video seemed a big step but also a logical choice.

What we did

One member of a research project going on at CDS in 2002, Mick Canavan, heard about the University of Bristol learning & teaching awards and he realised that using digital technologies for our teaching would make a good case for this funding. So together with Mick, Pete and I put together a proposal, which took us a month or two. We already some knowledge about Mac OS X within the centre in both myself and Pete so we felt Mac would be the best route. We had some initial meetings with the Learning Technologies Support Service at the university & also academics from other departments, but essentially we put together the ideas ourselves. We planned for a central server to store all video materials, and then decided on 7 client computers that would connect to this server. With this initial

proposal we were only able to budget for £15,000 so this dictated how many client computers we budgeted for.

One major decision we had to make was about software. Showing video would be no problem – QuickTime Player would easily suit our needs. Recording video was more difficult. Many video editing packages (e.g. Adobe Premiere) are so feature-packed that they are not user-friendly at all. We needed something very simple to use on a daily basis. Other packages such as iMovie are much easier to use just for recording, but compression is not straightforward at all; a complex set of codec settings are required. Furthermore, we needed dubbing capabilities that we were not able to find in any software package currently available. So we developed our own software (called 'Panda'). With Panda a user can record and compress live video very easily with automatic compression into MPEG4. Panda also allows for live dubbing of audio onto pre-recorded video and vice-versa – these functionalities are both needed for teaching interpreting (i.e. from BSL to English and from English to BSL). It is important to stress that the dubbing capabilities of Panda are what make it unique. Several digital video packages allow dubbing audio onto video but we were not able to find a single one that would dub video onto audio. This is what makes Panda so incredibly useful for us.



Example of Panda software being used to dub audio onto pre-recorded video (for interpreting BSL into English)

Implementing our study

We were so eager to start our project that unfortunately we did not do much piloting. We knew that digital video requires an enormous amount of storage space, so we budgeted for a server with a huge amount of hard drive space (360 GB). (This was one thing we did well. Currently our server is less than half full, so we still have plenty of space.) When deciding on the server, we considered a Linux machine – stable, cheap. But in the end we decided on Mac OS X server for its ease of use. We anticipated that a Linux server would require a technician to maintain it while Mac OS X server would be easy enough to use by any staff member with a bit of training. (See below for more about Mac OS X server.) For the other equipment, we decided on client machines and webcams based on

machines that we already had access to. So, after we had bought the server, we tested the whole setup with an eMac as client (which worked well) and we tried several webcams until we found one that produced acceptable quality for sign language.

So, we did do some initial testing, but certainly not a full pilot. If we had it to do over again, we would have spent several months piloting the lab with students testing the software and equipment. The main reason we did not do this was that we had a pressing practical need for the lab. Our previous method of teaching sign language required VHS video players and televisions (15-20 of each). This equipment was used so often that by the end of each academic year the vast majority of them were broken. In the summer of 2003, we were faced with the cost and time of repairing this old equipment or setting up the new lab. We chose to go ahead and set up the lab.

User feedback

One of the conditions of the initial funding was that we would conduct a user feedback survey. Our users consist of both staff and students; however, the two groups use the equipment and software in different ways, so we produced two different feedback forms – one for staff and one for students – which was conducted in the first year of the project. The results of all of these evaluations were compiled into a feedback report (attached).

The responses from the staff and students about the SignLab were both positive and negative. The positive feedback included praise for the use of this technology, in particular the advantages of the lab over the previously used TVs and VHS players. Users noted that the lab is much more efficient than the use of analog video – i.e. no time wasted rewinding or copying tapes, no space needed for storing video tapes. Ease of use was also noted as a major advantage. Users noted that manipulation of digital video in QuickTime Player is much easier than analog video with VHS players, re-recording is much simpler with the computers, and submission of work to tutors is also easier. (Students submit their work by simply dropping the video file they have created into their tutor's drop box in their home directory.)

Negative feedback centred mostly around lack of training. Both staff and students felt they had not had sufficient training in how to use Mac OS. Also several comments referred to the low quality of some of the video clips. (The reason for this low quality is that some video clips were digitised from VHS rather than being created digitally.) Finally, students expressed concern about not having enough access to the lab outside of class time and many wanted to be able to access the server from home.

This report was fed back to the users and it was also reported back to the Learning & Teaching group at the university who had provided us with the funding. More importantly, the results from the feedback helped to dictate our next steps in the development of the software (see the matters arising section at the end of feedback report).

Problems

Lack of continued funding. This has been and continues to be our largest obstacle. Getting funds to start up an innovative and useful project such as this

one was not difficult – it is an easy new idea to sell. But the infrastructure to continue support and maintenance of such a system is just not there.

Realistically speaking, our main goals at this point are:

- To secure funding to keep our technician on the payroll for maintenance
- To secure funding to continue to develop the system and the software

So far we have been able to accomplish both goals. With the funding we have secured so far, our technician spends his time doing tech support as needed and continuing development when not. Ideally in the future we would like to have the funding to bring in a new technician devoted solely to tech support and also keep our current technician for software development. But it is very difficult to find funding only for maintenance of a system already in place.

Lack of space: We only have 2 classrooms available for all of our teaching. Only one of the rooms was big enough to house 7 computers, so this is the room that became our lab. However, because we only have the 2 classrooms, we often end up using the lab for teaching space even when the computers are not being used at all. We recognise that this is a huge waste of a wonderful resource, especially because one of the biggest complaints we have received from students is not having enough access to the lab outside of class time. What we really need is a dedicated lab in addition to 2 teaching rooms. One way we are trying to alleviate the lab access problem is by looking into giving students access to the server materials from home – this way they would at least be able to view the materials at home. But security and firewall issues related to this are not trivial so we are currently looking into this.

Technical problems. The software the server was initially supplied with had some bugs, mostly to do with users not being able to view files they should be able to, and controls on the amount of space each user had failing. We recently upgraded to the most current version from Apple, and these problems have disappeared. Even so it has still proved necessary to employ a technician for problems users encounter with the system.

Difficulty finding new staff. Furthermore, we have the added difficulty of communication issues in our department. Since we are a deaf studies department, we have a bilingual communication policy – all staff are bilingual in both English and British Sign Language (or must learn BSL if they do not know it when they are hired). Because the technician works so closely with the sign language tutors, he must be able to communicate with them in BSL. So even if we did have the funds to hire a new devoted technician in order to allow our current technician to focus on development, any new staff would have to learn BSL. This, along with the added difficulty of finding technicians familiar with the Mac platform, puts us in a very difficult position.

Supporting staff in multimedia projects. We were so focused on the use of the lab by the staff and students for teaching purposes (envisioning different scenarios involved with teaching only) that we did not consider the use of these technologies by the staff for their own multimedia projects. This is not an issue so much with the project itself, but with the very useful equipment and software that we have brought to the department. Staff want to use these technologies for their own multimedia projects but offering them support is not among the duties that we were expecting. Again, the communication issue means that we cannot easily outsource these projects as staff prefer to work with our technician who can sign.

No Mac support from the University. The University of Bristol is quite strict in its support of Windows and no other platform. In deciding on using a Mac platform for our lab, this is something that we anticipated would be a problem but we were not sure how much of a problem it would be. As it turns out the effect of this has been difficult to quantify – we are not sure how much it would help to have support from the central university help desk, although we are quite certain that there are some aspects of maintenance of the system that we could outsource to them if we could.

Current task

In order to address this particular problem of justifying our use of the Mac platform, we applied for further funding from the learning & teaching group at the university. We applied for and won a one-year extension (2004-5) with two main goals: Added functionality of the Panda software (i.e. to allow for insuring newly recorded clips into pre-recorded clips), and to technically evaluate the possibility of adapting Panda for the Windows platform. The former goal was meant to meet the needs of our staff and students, while the latter goal was to determine how feasible it would be (or would have been) for us to develop this software on Windows (obviously is a more widely-used platform). The idea is this: If the evaluation shows that Panda could be easily ported to Windows, then we may have an extremely marketable product on our hands. However, if not, then we can make a very strong case to the university for needing Mac support from the central help desk.

Next move

We have discussed the possibilities of 1) using our setup for distance learning, 2) using our setup for video email, 3) offering our advice, software etc to other sign language teaching programs, 4) offering our software to users in other disciplines (academic or not) which might benefit from easy video capture and audio and/or video dubbing. Sports Science expressed an interest for remote coaching of sporting activities. Practically speaking, we are willing to go any of these directions (or any others if anyone has suggestions) that would gain us further funding!

We are currently in the process of creating a database, and associated software, to enable staff to better use the content already on the server.

About the Authors

The two key people in this case study are myself, (Kearsy Cormier, a lecturer in deaf studies – my particular area is linguistics), and Pete Carss (currently the SignLab technician, Pete is the person who created the software ‘Panda’ that we use in the lab).

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Kearsy & Pete's Top Tips

1. **Don't reinvent the wheel**. Spend the time researching the technologies you plan to implement to see if others have done something similar. You can learn a lot from their successes and mistakes.

2. **Pilot your project first**. Make sure you give yourself the time to do this. This may mean implementing your full project much later than you expected but it is much better to know about faults and weaknesses in a pilot than in the project proper.

3. **Test scenarios**. When you are piloting your project, imagine yourself as a target user and actually walk through all the steps you would do as a target user, in as close to the actual environment as possible. Try to think of other scenarios as well. Set up a meeting with everyone who might possibly have access to your equipment or software when the project is underway. Brainstorm to see how they might be able to take advantage of your project as well.

4. **When budgeting, give yourself as much of a cushion as possible**. Don't skimp. Also budget for costs relating to salary – tech support, consultancies, etc. Our funding problems would not be nearly so severe if we had budgeted for incidentals and unexpected costs.

A Patient Video to Facilitate Self-Study in Neurology

Valerie Cooper
Robert Gordon University

Background

I have been using and developing video-based self-study packages since 1999. My first web-based package was to enable first year BSc (Hons) Physiotherapy students to use videos of human movements to study anatomical movement analysis. The idea for this arose after attending a presentation at Robert Gordon University on Question Mark Perception showing a video embedded with questions on bird flight and I thought of the application to human movement. Students were taught anatomical movement analysis, at that time, through practical classes, using classmates as models with feedback from the tutor. In the weeks before their exam, which included testing of this skill, the students requested extra tutorials to allow them to practice with feedback. It was not my intention to replace the practical classes but to provide a means of self study which would give them access to videos of common normal movements with the appropriate questions and feedback. The pilot and initial evaluations of this package were extremely positive and revealed that the students also desired access to patient videos to support their study of different pathological conditions (Cooper V. McConnell M. 2000) (Cooper & Ogilvie 2003).

Following their clinical placements, students have reported that they find this experience of value in helping them to visualise the symptoms, presentation and problems of patients with various conditions when they come to study them in greater detail later in the course. Previously during the neurology module, students had visits to the stroke rehabilitation unit at the hospital to observe the assessment and treatment of patients with this condition. The number of students taking this module has increased from around 25 to approximately 64 rendering these visits unsustainable for the hospital staff and patients. It therefore seemed vital to provide these students with an alternative means of visualising this condition which is possibly the most common type of neurological condition they will be required to treat as practitioners, the incidence of stroke in the U.K. being about 1 in 500 (Honan 2004). I therefore decided to make my first “Virtual Patient” a video case study of a stroke patient.

Creating the Stroke Self-Study Package

The first step was filming the video clips; this presented a challenge, as a patient who had suffered a severe stroke was the subject of the video. It was therefore necessary not only to gain his informed consent, but to also acquire the approval of his next of kin and his consultant physician to ensure he was medically fit enough to take part. The chartered physiotherapists and physiotherapy helper who were filmed also gave their consent. In obtaining consent it was important that the participants understood that although the video was being used solely for educational purposes it would be web-based, however they were reassured that access is password protected.

A severely affected patient was deliberately chosen to allow the students to see the full extent of the possible problems they would need to address in their assessment and treatment of this type of patient. In finding such a patient who was willing and medically fit enough to be filmed I had the help and support of Jenny Robertson the Senior 1 Physiotherapist in the Stroke rehabilitation unit. She was able to discuss the project with the patient, his family and the consultant and was also the lead therapist in the film. I am sure this contributed to our successful recruitment of the patient as he and his family were familiar with the therapist and the treatment setting.

The video depicts an entire therapy session with the patient in lying, sitting and standing. It was shot using 2 cameras with appropriate lighting etc. I had excellent support and advice in this from the Multimedia department at R.G.U. who also filmed the video. It was important for them to know what was required from the video to facilitate provision and transport of the correct equipment to the rehabilitation gymnasium at the hospital. I had learned from previous experience that it is useful to have a script of the planned video and in order to write this I had to understand the capabilities and clinical severity of the patient and Jenny again advised on this. Various views were filmed so that students would be able to see the patient in as similar a manner as possible to real life and close ups were also taken to allow for greater visibility of muscle and body contours. The patient was required to be dressed only in shorts, as he would be for his usual physiotherapy session, and care was taken to maintain his dignity and decency.

The finished video was edited into a series of short streamed clips and each was embedded using HTML in the self-assessment tests created with Question Mark Perception. Jenny Robertson and another lecturer reviewed all the self-assessment questions and advised on necessary changes to ensure that the questions related to the module content. The Decision Tool including the three I's quiz (Thornhill S., Asensio M, & Young C 2002) was used to inform this process. It was found that although the project scored fairly evenly on Image (2) Interaction (4) and Integration (3) Interaction was the highest priority. This is possibly because the package is intended to provide materials for self-study and assessment. Smith and Andrews (1985) state that the deficiency of conventional linear video is that it lacks the ability to elicit and accept use responses and provide feedback within the program. Computer based video in the form of clips embedded into self assessment tests provides this interactivity and is therefore more likely to stimulate adult learning. Cennamo and Dawley (1995) state that self tests included in the design of interactive video can help adult learners to identify knowledge deficiencies and misconceptions therefore enabling them to set their own learning goals more effectively. Image and integration were also deemed important factors in the design process as the questions are largely based on the students' observations and study relates directly to a particular module within a conventionally taught course. The tests are linked to fictitious case notes and investigations such as a Computerised Tomography (C.T.) scan. Other study materials are also provided.

Implementation and Evaluation of the Package

It was decided to base the package within the R.G.U. iNet to facilitate integration of the package to the existing course and module material. Van der Velden (1999) states that to avoid the separation of knowledge systems and students being unable to relate what they have learned to other parts of the course the package should be related to something they already know i.e. the rest of the course content. The students are introduced to the package in a timetabled

session within the module to further enhance integration. This not only allows them to ask any technical or practical questions but also allows reinforcement of how and when they should use the package in relation to the module delivery as a whole. The first cohort of 24 year 1 MSc (pre-registration) Physiotherapy students has just used the package in their Neurology module. This initial use has served as a pilot to the use of the package with the larger group of about 70 BSc (Hons) Occupational Therapy and Physiotherapy students. Unfortunately there was a problem with the second timetabled introductory session for one half of the group. The wrong computer lab had been allocated which did not have Real Player on the computers making them unable to play the videos. As it was impossible to schedule another session they were e-mailed detailed instructions on how, when and where they should use the package. The students were advised to access the package as often as they wished but should try to complete it about three times. They were also advised of the test at the end of the module.

Any new approaches to teaching and learning should be evaluated to ensure they are effective and acceptable. Evaluation of the clinical package for Stroke is on going. I am using an on-line questionnaire to discover student attitudes to the packages. Various studies have sued this method to elicit student attitudes to similar packages (Green SM.Voegeli D.Harrison M.Phillips J.Knowles J.Weaver M.Shephard K. 2003) (Madariaga E.L., Rojas M.M., & Barrios G.H. 2003). Summative assessment takes place through a previously unseen test version of the package. The reporting facilities in Question Mark Perception give a clearer picture of how the resources are used and scores from the students self study attempts can be compared to their test scores to see if there is an improvement in learning. The next section will report on some preliminary results from this first cohort of students to use the Stroke package.

Evaluation Results

Question Scores

All 24 students sat the final test version of the package, 18 answered the evaluation questionnaire. There were 7 students who only sat the final test version and had not managed to access the self study version at all before the test. The test results ranged from 41% to 100% and the mean was 76%. The self study scores ranged from 33% to 75% and the mean score was 65%. The scores of those who accessed the self study version were compared to their test scores to see if their knowledge of the subject had improved. Of the 17 students who sat the self study version 13 of them improved their scores in the test version. All the students who sat the self study version more than once improved their scores.

Questionnaire results

The questionnaire uses a Likert scale to elicit the students' attitudes towards various characteristics of the package.

Students' attitudes tended to be generally positive. The most valued characteristics being that it was clear and easy to use (all 18 students agreed or strongly agreed). 5 students strongly agreed and 10 agreed that the videos supported learning but 3 students disagreed with this. Characteristics which some students disagreed with were; that it was enjoyable (6), increased confidence in computer based learning (6) and was worth the time spent (6), though most students (12) agreed with these statements.

Responses to some of the open questions in the questionnaire help to clarify some of these attitudes. Students were asked to reflect on the learning experience and to say how they felt the package had affected this;

8 gave positive responses e.g.

> *"It is good to actually be able to see how you apply the things we learn in practical to an actual patient and it is a good tool to have to review neurology before we go out on a neurology placement."*

5 gave mixed responses e.g.

> *"I don't think I did the package any justice as I've not had enough time to give it with the course being so busy unfortunately especially with the access only being on-line. That's why I feel giving us the package on CD would allow me to fit it into my own schedule better by using it on my computer at home. I feel our practical classes and lectures prepared us for the assessment and they linked well."*

2 gave negative responses e.g.

> *"Hasn't helped me and will not use the package again. Felt it was inconveniently timetabled and my time would have been better spent elsewhere"*

Students were asked for their suggestions for improvement of the package but there was only one given;

> "*Video clips too small when able to be seen clearly"*

Discussion of results and Future Plans

Although these initial results seem quite positive there are some important issues raised. I'm sure the lack of an introductory session for some students lead to a lack of uptake of the self study version of the package. It was therefore important to ensure these sessions for the next and larger cohort of students were timetabled correctly. I was also aware of the suggested problem of the video quality reducing when enlarged, but am still unsure whether it can be solved. I had taken trouble to ensure that any movements requiring closer inspection showed a close-up but the student cannot choose to do this themselves, however this may become possible as technology improves. An important problem mentioned by one student was that of sound. The students have to use headphones on their university computers which may necessitate plugging them into the back of the computer. Students are thus in an extremely uncomfortable position looking at the screen as the headphone leads do not stretch far enough. We are negotiating the use of a computer room specifically for computer based assessment, which will have all the necessary requirements for video and sound. A student suggested the package be based on CD-ROM to allow home use but others successfully managed to access the package from home. Previous studies have also highlighted problems with access, particularly to video clips as being of concern to students (Green SM.Voegeli D.Harrison M.Phillips J.Knowles J.Weaver M.Shephard K. 2003). This year I have noticed, through informal conversations with students, that more are accessing the package from home as access to and uptake of broadband in our area has increased. I have been reluctant to base the package on CD-ROM as I feel that the patient videos need to have password protection and having a CD-ROM version would increase the risk of "pirate"

copies. Another reason for keeping the package web-based is that the content can be easily adjusted should other courses require different questions or if clinical practice changes.

The question results seem to indicate that the students' learning has improved although with this type of evaluation it is impossible to tell, without a control group, whether this is due to the package. It is encouraging however that those who used the self study version more seemed to show more consistent improvement than those who only used it once. A larger sample size may shed some light on whether this is significant.

I am hoping that the next cohort of students will receive the package even more positively if some of these problems are overcome and look forward to analysing their results.
I am continuing to develop further self study packages using video and the next "Virtual Patient", an amputee, has already been filmed.

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Valerie's Top Tips

1. **Plan the learning experience**: Think carefully about how you are going to use the video to enhance learning don't just publish it on to the Web hoping the students will get some benefit from it. Think about how it integrates with the relevant module material and learning outcomes. Make sure the teaching team of the module are "on-board" and involved in the development. They can re-enforce its use to the students who will be less likely to see it as something extra or separate and more likely to use it.

2. **Seek out technical help**: Contact your multimedia department or technical support department. They are experts at filming and streaming and can offer very good advice about what is or isn't possible / practical.

3. **Script your video:** Have a really detailed idea of what you want to include in your video down to clothing, props, environment and angles. Write a "script" so that the others involved in the filming will also know what you want to do. Ensure that those you are filming have given you their informed consent to appear on the internet.

4. **Investigate the students' computer access**: The build on their computers may differ from the staff build in terms of media players, speed and sound capabilities. Just because everything works fine on your computer it may not go so smoothly for the students.

5. **Evaluate**: Have a strategy for evaluating the use of the video and pilot this first. The process of making streamed video to use in teaching and learning is lengthy and costly; you need to show that it was worthwhile.

Mastering University'; A Postgraduate Induction Programme on CD-Rom which Integrates Video and Text in a Journey of Learning

Richard McCarter, Colin Beard and Alison Hudson,
Sheffield Hallam University, UK

Introduction

This case study describes the development of a digital media application and the use of digital video in the application to support learners. The case study has three main perspectives. The first perspective describes the work of the multidisciplinary team when it set itself the challenge to build a CD-Rom from video recordings taken of an introductory two day course for postgraduate learners. The second perspective reflects the ideas that influenced the educational design of the CD-Rom. The third perspective exploits some of the underpinning theory and relates to the work done by JISC/DNER Click and Go Video, The Three 'I' framework (Thornhill, Asensio and Young 2002). The CD-Rom, now entitled *Mastering University* (available commercially) represents both a fusion of skills of expert practitioners at Sheffield Hallam University and the development of research and practice. The team was made up of a group of practitioners; Colin, a lecturer and facilitator, Alison a lecturer and manager of the multimedia team (with experience of orchestrating interdependence and integrative learning and working in VLEs) and me, an educational television producer. It was the team's expertise and individual contributions that had an impact on the educational design of the CD-Rom. The CD-Rom was subjected to intense evaluation and the results collected from student feedback are now being introduced into other projects.

The challenge, the influences, and the different perspectives

The next section describes the task of developing a CD-Rom through the eyes of the multidisciplinary team and the learning context, which included curriculum development, production and research-based practice. It was experience and know-how that shaped the educational design of the CD-Rom and although my contribution and influence was essentially a directing one, I also contributed to the educational design of the CD-Rom. As an experienced practitioner and as a postgraduate student attending an on-line distance learning course in eLearning, Multimedia and Consultancy at Sheffield Hallam University, I felt strongly about the need to enhance the learning experience with compressed video. I had just completed a PGCE in Teaching and Learning in HE and felt that the future for

digital video and learning holds some exciting prospects when video is embedded in other materials (Hede and Hede, 2000). Salomon (1984) has already explored the effects of television and the amount of invested mental effort expended amongst students when he compared the results of children's' learning when using the same content in television and text. I was intrigued by the study, but I wanted to use video to build a relationship between video and text for adult learners. It's also worth noting that Koumi (1991) writes on the value of pedagogy and screenwriting. He has produced a set of categories for different uses of video and this has also influenced my thinking.

So an opportunity was created when I was invited to record the activities on Colin's postgraduate induction programme in the Faculty of Organisation and Management. As a lecturer, Colin has been teaching postgraduates for more than 14 years and during that time he has developed a unique postgraduate induction programme. This programme is run every year at Sheffield Hallam and is an introduction to writing and thinking at masters level. The course provided the inspiration for the CD-Rom. Colin's teaching, facilitation and learning techniques were and are a strong influence. He has taught across the globe and has widely published work on outdoor education and recognised key text on experiential learning, (Beard and Wilson, 2002).

"I've been using facilitation techniques on postgraduates and undergraduates over many years. In the 2 day programme for postgraduates I introduce the learners to masters level study. I use tried and tested facilitation techniques and combine these with a variety of literature on study methods and study theories in order to engage, motivate and stimulate discussion and learning activities. Although it has been successful as a face-to-face experience for many years, there was a need to find a way of creating an electronic version for international distance learning students who cannot attend the programme. "

The pedagogical approach that Colin has developed, acknowledges the anxieties of learners and gets students to work on a range of activities, which I recorded on a single camera. The pragmatic approach and use of a range of study skills, confidence boosting activities and techniques to introduce learners to study methods was invaluable from the camera's view-point. The camera became part of the audience; capturing Colin as he moved around the lecture room, recording students as they engaged with the literature in group tasks and taking care to record interactions and big close ups of students' writing. It was at this point, that we realised that by capturing the atmosphere and working conditions in the lecture theatre, that we were halfway to developing an electronic version of the induction programme itself; the rest was more difficult.

The mix of facilitation and video treatment techniques

The mix of imagery and dialogue needed to capture more than just the nature of the activities. Although we had set out to create a resource that gave learners a confidence boost and developed learners' writing skills and critical thinking, we felt the need to add something extra in order to create a set of positive emotions and to generate a sense of a deeper level of engagement. The act of continuous engagement was achieved through video, but the strategy was to draw the learner into the text at key points in the CD-Rom. We did this through video treatment and video style. The term video treatment is taken from the film and television industry and is applied to explain or describe the contents and structure of a television programme. The term video format is used to indicate the style of video to be used. This is how we introduced the extra footage. We incorporated a personal instructional style of video, (the one-to-one tutorial) and an emotional

style in an attempt introduce learners to the contents and to take them on a virtual journey. We also used informal delivery methods such as use of words, phrases and acknowledgement of learners' anxieties in different video clips which we felt would help to craft a social relationship with the audience. This meant including some text instructions with more video clips of Colin encouraging learners to experience the learning by attempting short tasks. The learners, who had the benefit of the CD-Rom, could watch others on video before attempting the same activity for themselves. This brings me to the other influence; the invention of the notion of a journey of learning.

The design and the philosophy

We relied on the expertise of a multimedia developer to create an appropriate interface to mirror the metaphor of a learning journey. The CD-Rom was designed with an interface to help learners access the video clips and text files. The graphic of a GPS[7] finder gives the resource its look and feel. It also holds the contents menu, video controls and via the GPS finder, learners operate the video. The interface also contained the graphics showing icons to indicate where text would appear in relation to video, a timer to indicate running time of video and easy to print pages for accessibility. The CD-Rom was built using Macromedia authoring tools and uses QuickTime video player. However, the look and feel of the resource is just one part of the story. The educational design of the CD-Rom was more challenging. The metaphor of a journey of learning provided a structure with which to hang the content on and the idea of a progression of learning through the CD-Rom. The GPS finder also mirrored the metaphor of a journey and helped to create an element of curiosity.

The evaluation

It was clear from the pilot and trials of CD-Rom that we had created a valuable resource, but at the same time we felt that there was a need to collect more feedback in order to test our original objectives. The CD-Rom became the focus of an evaluative case study in 2003 using approximately 100 postgraduates from different educational and cultural backgrounds. Three types of evaluation methods were used (questionnaires, interviews and reflective critiques). The results highlighted a number of attributes. The integration of video and text was considered to be the CD-Rom’s strongest attribute. Learners felt that the video and text complemented each other; learners felt that they would be drawn towards the text through video. The value of the tutor's persona on screen and informal delivery reduced anxieties and helped to craft a social relationship. We also discovered that the learners engaged with the CD-Rom in three different ways. There were three categories of learning engagement; an emotional one, a curiosity or novelty one and a cognitive one. The relevance of this is important. We discovered, almost by accident, that some learners were simply curious about the contents of the CD-Rom and were drawn in by the video to such an extent that they went through the video before reading the text. Also, we hoped learners would interact with video, but it became clear to us that learners tended to see the interactivity working, but did not rate it as highly as the integration. Although the CD-Rom was aimed at independent learning, the instructional style of video was reviewed positively. In an interview, one learner referred to video as the 'revelation factor'. By this she meant that although the studying tips were simple, they were effective because learners could understand the concepts more easily when visualised and captured on video rather than text.

[7] Global Positioning System for pilots, yachtsman and explorers

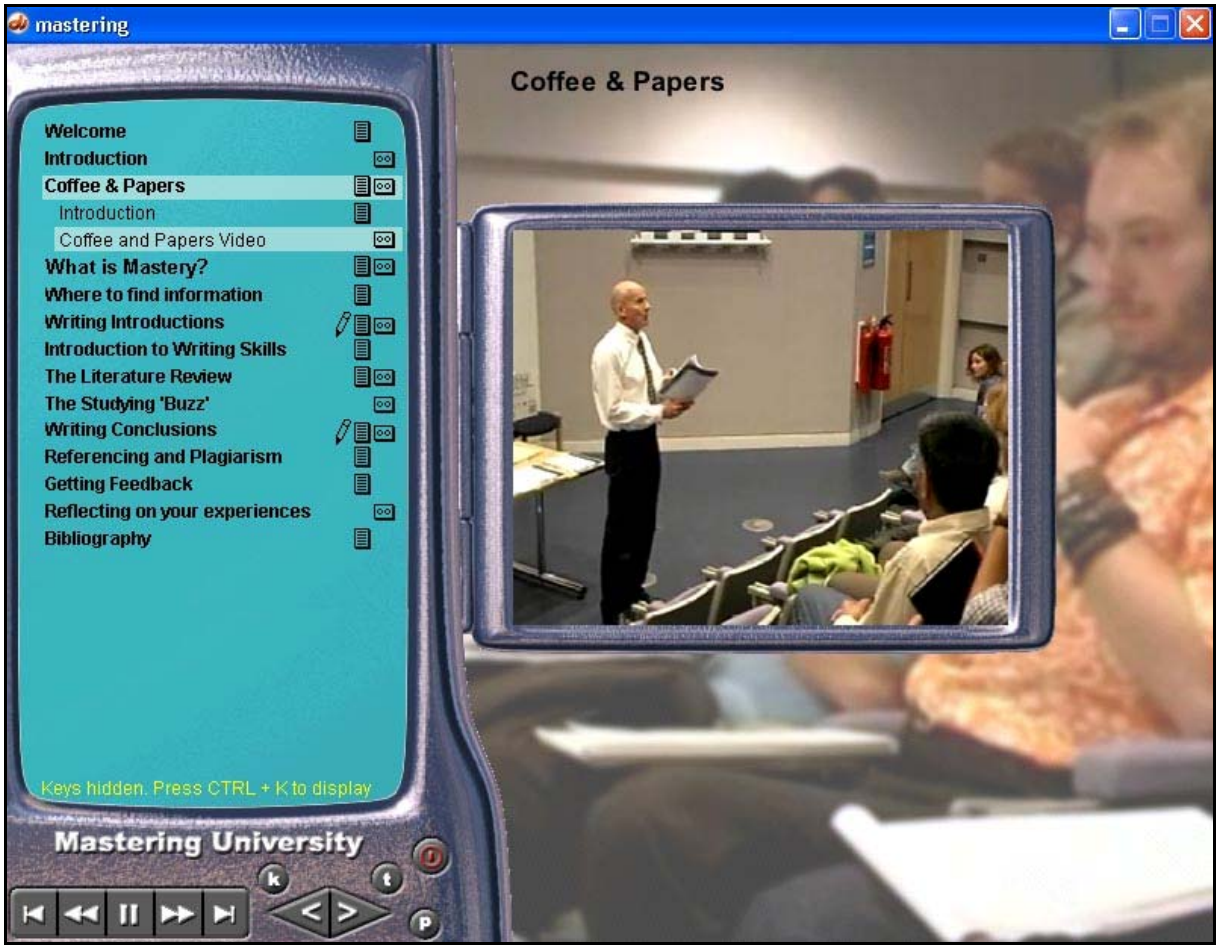

Fig 1. A frame grab from the chapter Coffee and Papers in the Mastering University CD-Rom

Summary

This case study revealed new insights into a pedagogy for multimedia resources. The multidisciplinary team approach and the different perspectives and experiences combined to make a valuable resource. The integration of video and text and simple interaction, the use of video treatment and the *Three I framework* helped us to see the benefits of using video in different ways and within a particular context. It is important to generate an emotional experience as much as a cognitive one.

Plans for the future

We have plans to make a second version of the CD-Rom. This will be aimed at postgraduates undertaking research and dissertations. We are also currently developing a voice files pilot at Sheffield Hallam University. It is using the same pedagogy and involves using short chunks of audio to support learners to develop their writing skills. The idea of drawing or hooking the learner into the literature by creating interest through informal chat and cognitive engagement in a single medium is being exploited.

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Richard, Colin and Alison's Top Tips

1. **Look for any opportunity to build a synergy between text and video**; the video can be used to support heavier literature. It is also important to sell the literature through video.

2. **Learners like watching other learners at work**; capture discussion taking place.

3. **Be personal and informal**; students also felt that this direct acknowledgement of their learning gave the resource a more personal touch and students felt that they had a personal tutor.

4. **Learning Engagement;** learners found that a mix of video styles helped their curiosity, so alter the style of format, maintain curiosity and find ways to hook learners.

5. **The value of instructional video**; we found that instructional video such as a one to one tutorial was popular amongst learners.

Study Tips Video Gallery

Phil Marston
University of Aberdeen

The Project Team

During 2004 the Academic Learning & Study Unit (ALSU) and the Learning Technology Unit (LTU) at the University of Aberdeen came together to produce a Video Tips Gallery for students to provide each other with useful tips for study and life at university.

Drs Sara Preston and Mary Pryor of ALSU provide a support service primarily for students, but also staff, to help students better manage their own learning.

The LTU provides support for academics and academic-related services in the identification, implementation and development of technology to facilitate these services.

The students who star in the Tips Gallery volunteered in order to help other students get the most out of their time at university (and to be entered in a free prize draw!)

Project Background

We wanted something engaging for the students that spoke directly to them on their own terms – though we didn't necessarily realise this to begin with (see below).

Sara and Mary had identified the need to provide further support online for the student community and had seen websites like Purdue University's Academic Success Center making use of video resources[8].

I've been messing around with multimedia since I first discovered Hypercard on my old Mac SE in 1990 and QuickTime when I later upgraded to a Mac IIsi. A decade has passed since then, but it hardly seems like it sometimes. It still feels like people have taken stuff produced for TV and plonked it on the web, offering little more than virtual VHS. A problem at the other extreme is when we have materials presented using the latest and greatest plugins and codecs, which few people have or even know how to get. On both counts the benefits of the web, such as bite sized chunks, of user controllable material, accessible to as many as possible, seems to be completely missed. That's quite apart from whether the content even needed to be presented in video in the first place!

I wanted to see if it was possible to do something better. Something that could take advantage of all those benefits of web delivery, the best features of multimedia (e.g. designing appealing usable interfaces in Flash that are customisable by both the user and the developer) and the best features of video, which in this case, was making the information personable and available in a form that was directly accessible to the intended end user.

[8] http://www.sla.purdue.edu/asc/

I had also seen a couple of presentations by Mike O'Donoghue, then of the Centre for Studies in Advanced Learning Technology at Lancaster University , speaking on using video in educational projects and advocating the "just go and do it" approach with some inspirational case studies.

Finally I've been of the belief that almost anyone can produce useful online video if they have something worthwhile to say and take the time to consider the appropriateness of the medium (e.g. short bite sized user-controllable chunks in this case). The tools are available and in my opinion they're not the hard part, this was my chance to put that to the test.

Doing it!

In some respects we started in the worst possible place. We started from a position saying "there's something we like about video, we'd like to do something with video on this project".

Having said that we immediately asked ourselves why and whether it was even appropriate? We had a notion that there was something about video that could help us achieve what we wanted, but we weren't too sure what we wanted, so to begin with we forgot about the medium and just brainstormed about what it was we were trying to do. In fact I would say we spent an unusual amount of time at the start of this project trying to identify what it was we wanted to achieve.

After reaching a point where we felt really comfortable with what we wanted to achieve, we started looking at what other people had done to see what we did and didn't like. We passed around various URLs by email and exchanged views and ideas[9].

We decided against clips that lectured to the students or provided long tutorials. This project was about allowing and facilitating the students to take ownership of their studies. That would inform the site design. It had to be a site by students, for students and students had to be able to choose the advice they wanted to see.

We created an online form and asked students to submit the tips they would offer to other students and also asked them whether they would be prepared to provide this same advice to camera[10]. The webpage was advertised by email to every registered student and toted to the students that attended the ALSU workshops. As an additional incentive (for the less altruistic), entry to a prize draw was offered with a total pot of £100 of book or music tokens. We received over a 100 individual tip submissions from over 50 students, 15 of whom were in turn filmed for the Tip Gallery.

Taking on board Mike O'Donoghue's advice, I provided Sara and Mary with a basic Sony MiniDV-Handycam, a microphone and about 30 minutes of playing with the camera. They then role played with the kit to get comfortable with it, taking turns to be camera-person and subject to see what it was like on both sides of

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[9] Some URLs that played a significant role were the Purdue one mentioned earlier, the Macromedia Flash Video showcase gallery seen here http://www.adobe.com/products/flash/flashpro/video/gallery/ and a site that showed how much information can be conveyed in ten seconds http://www.tensecondfilms.com/

[10] You can see an example of the online form here http://www.abdn.ac.uk/~clt011/alsu/TipRequests6.shtml

the camera before filming the volunteers. We worked on the principle that a casual and relaxed approach would get the best results. Shooting "as and when" and shooting hand held was intended to provide an atmosphere that didn't inhibit the intended message. The most important skills were not about anything technical, but were more about how to hold the camera comfortably, being aware of keeping the clips short and about making the student at ease with the filming. Importantly, we reappraised our approach and its results at regular intervals. With this approach most tip clips were shot in one, with only an occasional retake.

One thing to note was the difficulty in finding an appropriate consent/release form, in particular one that didn't sound like the subject was signing their life away![11]

After we'd got as many students as we thought were going to show up, the footage we had was copied onto an iMac running OS X and iMovie 3 via the camera and a firewire cable. It was possible to remote control the camera using the software, which also automatically divided the footage into separate clips where the camera had been started and stopped during filming. Editing was simply a case of choosing an 'entry' point and an 'exit' point for each clip and exporting to QuickTime. The clips exported from iMovie were later going to be converted to Flash, as this was the intended media player. Working on the principle of keeping the best quality possible throughout the process, the clips were originally exported in DV format (e.g. same quality as the original recording). Unfortunately, whenever DV files were accessed on the PC (Win 2K) that was being used to re-encode as Flash, the PC crashed (No blue screen of death or anything, it went straight to restarting at the BIOS POST level!!). I've since heard this is a problem with DV on some PCs. I ended up exporting the clips using QuickTime and the Sorenson 3 Codec, then converting them to both Flash swf and flv formats at a range of data-rates using Sorenson Squeeze 3.5 on the PC.

During the period Sara and Mary were gathering footage, I was lucky enough to find that Macromedia had released the source code for their Flash Video Gallery (see earlier footnote), along with a tutorial about how it all worked! This saved me a lot of development time for the presentation interface. As you can see, the ALSU Video Tips Gallery[12] is obviously heavily based on it!

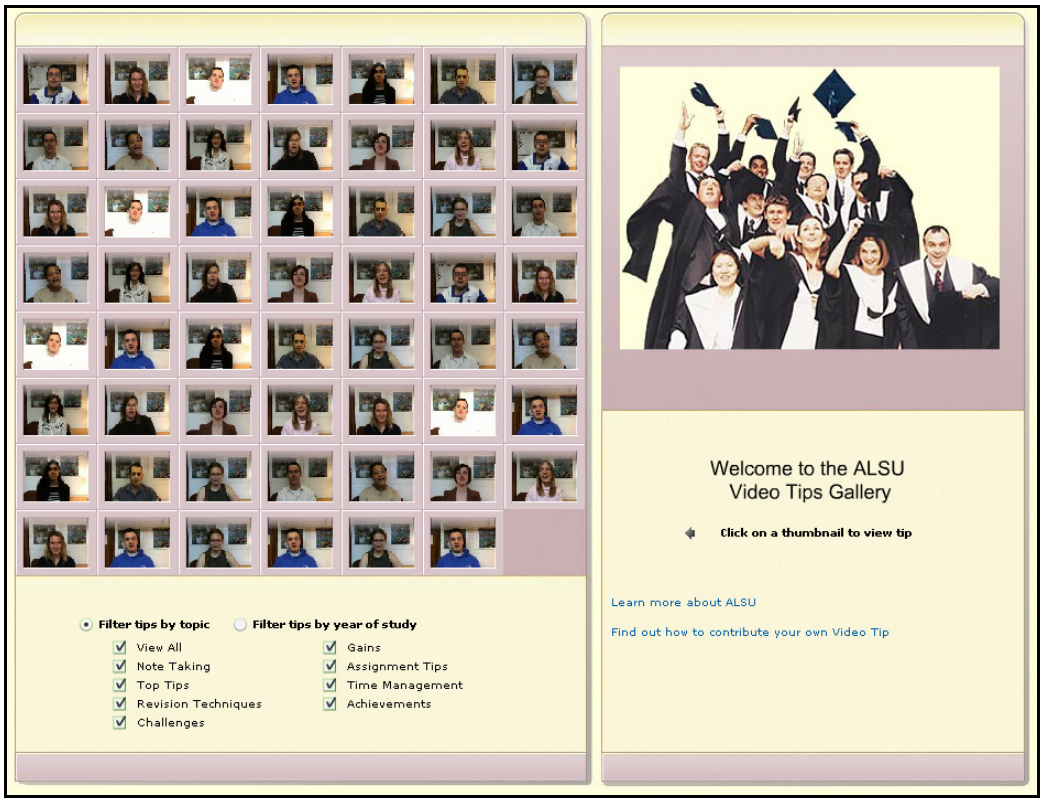
One issue still outstanding at the moment is the use of Flash Communication Server (FCS) to handle the streaming video. As an institution we have adopted FCS as our main, recommended and supported streaming server (with Darwin as a back up for projects requiring open standards like mpeg4). We already produce quite a number of projects using Flash since it is a relatively easy development environment, has huge amounts of support resources available and an unparalleled player ubiquity. Using the Flash player to deliver video content gets away from using the proprietary and cluttered interfaces of most media players and their often-complicated installation and running requirements. Unfortunately, there's been a lot of reorganisation of the central systems this summer and the FCS has only just become available. So we're still working out how to implement this aspect of the project.

Implementing the Project

[11] The one we eventually came up with can been seen here http://www.abdn.ac.uk/alsu/ReleaseForm_March2004.doc

[12] You can see the real thing here http://www.abdn.ac.uk/alsu/VideoGallery/

A beta version of the gallery, with non-streaming clips, has been put online and has so far only been viewed by staff. As this is now the start of term the first students to be able to use the Tips Gallery are only just appearing, so we're working hard to get it usable for when it's going to be most wanted by the students, time will tell what they think.



We will be incorporating a feedback button where they can submit comments in a similar fashion to the original invitation to contribute. There will also be an invitation to contribute further tips and we will be monitoring the server statistics in an attempt to get a clear picture of the Video Tips Gallery usage.

What next

Of course it depends on the response we get from the students, but hopefully this project will continue and more students will offer their tips. We'd like to add a send a tip to a friend option too.

I have an idea for building an interface using Flash that would automate the tip submission process. Taking advantage of the Video Conferencing facility built into the Macromedia Flash Player and the video handling facilities of Flash Communication Server, it should be possible to allow students to film themselves straight into the gallery using a webcam. They could then edit their clips by selecting the 'in and out points' the server should use. Obviously the clip would have to await approval by ALSU before it could be made publicly accessible, but it could cut out a lot of development time.

Outside this project, a member of staff has expressed an interest in being filmed on location to talk about field related topics, to accompany the virtual fieldtrip we

built for their geography course[13]. Another enquiry has come in about streaming live footage from under the North Sea!

I'm also going to be developing some staff training to help people realise they can do this sort of thing too.

In conjunction with the team who manage the servers, we're also trying to work out a way of allowing any member of staff to stream flash video from the FCS as easily as publishing a normal webpage on the webserver – namely just placing it in the appropriate folder in your network file space.

Phil's Top Tips

1. **Be really, really clear what your message is before you start** – even if you don't use a script, try to write one so you've really thought about what you're trying to say. Then when you're filming, just go with the flow as long as the message is still essentially the same you'll have a footage that is comfortable to view.

2. **Don't get hung up on technique or technology.** As long as you have an understanding of basic composition and lighting and don't do anything extreme, that should be fine for most projects. Remember the message you're trying to convey and that you're shooting for the web, so long lingering arty shots will cost you bandwidth, without necessarily adding anything to your production.

3. **In the edit, keep things simple.** If you have to put two or more clips together use simple transitions like a straight cut or cross dissolve. Apart from making it easier on bandwidth/encoding, it doesn't distract so much from what's being said.

4. **Don't forget what medium you're doing this for** – and who uses that medium. If it's the web, you're not broadcasting to a homologous audience, you're attempting to engage with an individual user each time. They're most likely going to be "leaning forward", trying to get your message quickly and wanting to take control of the delivery. They wont want to sit back passively and wait to discover what it is you're going to tell them when you're ready to get round to it.

5. **Just have a go!** With today's tools and facilities the most you've got to lose is a little polish! ;-)

Note: Since this case study was written, the LTU and ALSU, along with Educational Staff Development, have merged to become the Centre for Learning & Teaching http://www.abdn.ac.uk/clt/

[13] http://www.abdn.ac.uk/diss/ltu/pmarston/geography/virtualfieldtrip/

Mindful Learning and the Design of Video Sequences

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Introduction

VirRAD – the Virtual Radiopharmacy – is a three year project, partially funded by the EU, which aims to create a readily accessible virtual community where the global nuclear medicine community can meet to learn, access information, exchange views and discuss best practice. Users of this virtual community will be able to enter a simulated laboratory environment, use simulation software to enhance their practice and knowledge of nuclear medicine procedures, and access specially designed tutorials which will offer feedback on user performance. Amongst the tutorial resources are a series of video sequences which are designed to demonstrate current nuclear medicine laboratory procedures in the UK.

The design of the virtual community and its learning resources are based on a series of questions and issues raised by Ellen Langer, collectively referred to as *Mindful Learning* (Langer, 1997). In her book Langer challenges a number of assumptions about education which include:

- 'The basics must be learned so well that they become second nature
- Paying attention means staying focused on one thing at a time
- Delaying gratification is important
- Rote memorisation is necessary in education
- Forgetting is a problem
- Intelligence is "knowing what's out there"
- The Illusion of right answers'

(ibid: *p.2*)

The application of Langer's work to the production of instructional video sequences presents an interesting design challenge: how is it possible to introduce Langer's learning ideas to the production of instructional video sequences?

Making use of distraction

In approaching this problem our initial attention was given to those *Mindful Learning* ideas which appeared to be most appropriate to the video medium. 'Paying attention at all times' and the notion of 'distraction' offered an appropriate starting point. The first video sequences were produced from scripts authored by expert practitioners in the field of nuclear medicine. The scripts and subsequent instructional video procedures focused on demonstrating the correct operational procedures for laboratory work. Dressing to enter a nuclear medicine hot lab, eluting a technetium-99 generator, and preparing an MDP kit were three of the themes of the first ten instructional video sequences produced (figure 1).

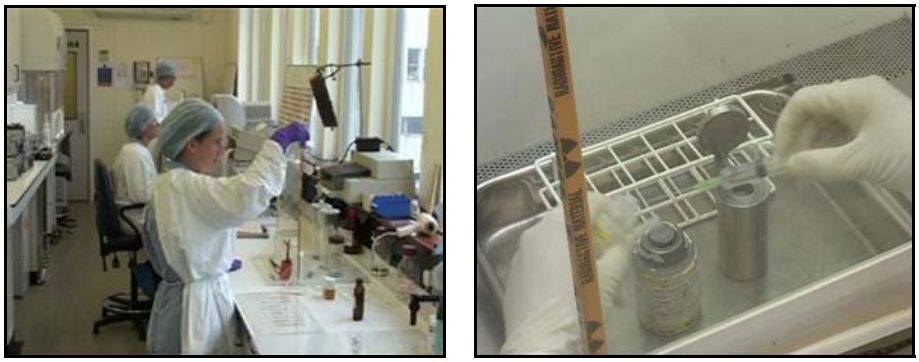

Figure 1: Two screen shot from the initial video sequences showing nuclear medicine procedures. The TLC procedures (left) shows the laboratory environment where much of the work is conducted in protected environments, such as the MDP kit preparation (right)

The nature of nuclear medicine requires a highly health and safety conscious environment and, from the production viewpoint, it was not obvious how a 'distraction' to enhance the video materials could be introduced. At this point we considered the nature of a 'distraction' in more detail which led three possibilities for investigation:

- *Unexpected events* – e.g. spilling a vial or removing protective clothing. Though this was a distraction which could be produced for video, it seemed to be not only an inappropriate for a laboratory but potentially dangerous for the laboratory personnel.

- *Interruption* of the instructional video sequence was a promising interpretation of distraction. We concluded this might prove to be little more than confusing for the video sequence user if it was not produced and executed well.

- *Exaggeration* could also be used as a means of distraction, one which lent itself more easily to a visual format than other considerations. If planned thoughtfully the important laboratory health and safety issues could be avoided.

One further design consideration for the video sequences at this stage was duration. Keeping the duration of the sequence short (1-2 minutes) was thought to assist the user's concentration throughout viewing. The short sequence duration also fitted in with the work of others, not least Alessi and Trollip (2001: 74) who suggest "…that video segments in multimedia be limited to twenty to thirty seconds".

Introducing visual exaggeration

Our first use of visual *exaggeration* was trialled with a non-technical video sequence. Filming at an international conference on radiopharmaceuticals was produced as a video sequence (4min 50sec) which was used to promote radiopharmaceutical discussion within the virtual community and at UK conferences. The sequence included a number of conference delegates expressing their views (a *vox pops* sequence) whilst drinking coffee and selecting small cakes. Close up shots of coffee cups and cake trays were used as cut-away shots between the delegate comments.

As a means of exaggeration a very large cake was produced by purchasing a supermarket chocolate cake, adding excessive amounts of cream and cherries. This was then filmed in close-up and a clip (1 sec) was edited into the sequence

at an appropriate point to present the illusion of one very greedy delegate (figure 2a). The complete video sequence was used with audiences at separate presentations in Manchester, London and Graz (Austria) who found this inclusion surprising and amusing. As the producers were aware of the exaggerated cake video element and were present at each viewing they were able to observe and record audience reaction. Audience attention picked up noticeably at the point of inclusion (29 seconds) and remained high throughout the rest of the video sequence. More than any other element the exaggeration formed the basis for participant discussion of the video content afterwards, after which discussion moved to reactions of the delegate comments.

Figure 2a. Exaggeration through the use of a very large cake edited into a discussion sequences.
Figure 2b. Unexpected event – a telephone call during a video interview.

Exaggeration in this fashion complemented the notion of unexpected events as a means of distraction to increase user engagement with the video sequence. A second example of distraction – in this case an *unexpected event* - made use of an unexpected telephone call to a video interviewee whilst recording (figure 2b). Normally this would be edited out of the finished video interview sequence, but the inclusion of this event and the reaction of the interviewee were again observed to increase audience attention to the video materials at the point of inclusion.

Both the *exaggeration* and *unexpected event* sequences offered a useful means of examining audience interpretation of a distraction in support of Mindful Learning. Within the setting of a conference or an interview each distractive element appeared to be sufficient for the audience to recognise that the clip was not part of the natural flow of the other events. In the case of the exaggerated cake clip, both the size of the cake and the action of eating it greedily were not normally occurring events. As such, the exaggerated cake clip stands in contrast to the other events in the sequence and audience comments appeared to recognise it as such. The same appeared to be true of the unexpected telephone call and reaction clip. Whilst this event was not artificial in the same way as the cake produced for exaggeration, the audience were able to recognise that this was not part of the intended interview. Two audience members reported afterwards that their interest attention was increased at that point in seeing the interviewee reaction to the unexpected call and to seeing how she dealt with the caller.

Procedural laboratory sequences

The application of a distraction through exaggeration or unexpected event to video sequences of conferences of to interviews provided useful feedback for both video production and audience interpretation.

However, most of the video sequences produced for VirRAD centred on the exposition of laboratory procedures. In order to introduce distractive video clips

to these materials we needed some idea as to how the audience – hospital technicians – were already making use of them and how they were interpreting the content. To this end an evaluation of two instruction video sequences demonstrating radiopharmaceutical procedures in the laboratory was carried out with four technicians at a hospital in north-west England.

Evaluation of instructional video sequences

For this evaluation we opted for a qualitative approach based on semi-structured interviews to examine issues in the content and presentation of the video sequences and to explore any learning gains. We asked how helpful the video sequences were for learning the procedures, whether they captured and held attention, and whether they were clear and had sufficient detail. We also encouraged participants to tell us how we could make the video sequences better. Our test for learning gains was very simple: we asked participants to outline what they felt they had learned of the procedures.

Four participants were interviewed - two qualified pharmacists and two pharmacy technicians - each with different degrees of experience in radiopharmaceutical preparation. Two procedural video sequences were selected for this evaluation, the first of two minutes and the second of four minutes duration. Participants were invited to replay the videos if they wished; two of the participants did this. Interviews were conducted immediately after viewing each taking between twenty and thirty minutes.

Both the two and four minute video sequences were seen as helpful for learning the procedural content. Two users commented that they appreciated the step-by-step approach. The visual aspect of the video was reported as very useful for trainees to get to know the procedure and equipment involved in radiopharmacy practice. One participant added:

> *"It's a pretty scary thing to do for the first time, if you actually see someone do it, then obviously it would be a great help" [J].*

Despite this, two users commented that in order to learn the procedures fully, they would need to perform the procedures themselves, either in a simulation or in a real laboratory:

> *"I think the best way to learn would be to have hands-on experience" [T]*
> *"I think there's only one way you can learn it fully, and that's to do it, try it yourself, if not in the real, using fake…" [H].*

According to Langer educational materials which engage the users' interest are more likely to promote learning so participants were asked whether the video sequences retained their interest and attention throughout. The two minute sequence was reported to hold all participants' attention; this was attributed to the short duration of the video and to the easy to understand content. The longer sequence gave rise to variation in response. Two participants believed that the video held their interest, but the experienced pharmacist reported she needed to consciously concentrate on paying attention due to its pace:

> *"…it was going a bit too quickly, not a lot but you had to really sort of concentrate…" [J].*

The experienced technician felt that she was not able to easily attend to the video as she found the technical terms very confusing:

> *"…because they were talking about things I didn't really know, then your attention does seem to wander" [T].*

Though none of the participants felt that the duration of the video sequences adversely affected their concentration or interest, there were some reservations about the longer sequence. One participant felt that she might learn more effectively from this if it were divided into two sections or if there were longer pauses in between voice-over explanations. Another participant felt that if it had been longer he would not have been able to learn all the information:

> *"I think it was getting to length where you wouldn't be able to take any more information in. I don't think it could be much longer, as it was quite intense, all the information" [S].*

Recall of learning differed significantly between participants. All recalled more of the procedures more accurately from the shorter sequence. Those providing more complete accounts of the procedures were either still studying or had only recently completed their study, so we might speculate that familiarity with the process of learning was helping them learn the procedures from the videos. All participants were able to learn at least some aspects of the procedures shown in the videos. When asked what other information they might need to learn the procedures completely, participants expressed a need for additional materials that describe the context or theoretical background of the procedures in order to increase their understanding.

Some participants acknowledged the concurrent explanatory voice-over and visuals as being particularly useful for their learning:

> *"…the detail was very good, the way it all linked together and the voice-over matched perfectly what the person was doing" [H].*

Overall, the participants demonstrated retention of the content of the video sequences in their accounts and felt that the visual aspect that the video sequences provided, in comparison to traditional text-based materials, was particularly beneficial for conveying.

Enhancing procedural visual sequences

The comments received from the small-scale evaluation of the procedural video sequences centre on the content of the video and how this can be synthesised with their own laboratory experience and existing knowledge. User concentration throughout the shorter video sequences was high due to the need for accuracy in replication and in the number of steps required to complete the procedure correctly. This differs from the interview and conference video sequence previously discussed in that users approached the instructional video sequence with a view to learning the procedural content. In comparison, the interview and conference video sequences were aimed at stimulating further discussion rather than recall or replication of content by the audience.

This viewpoint suggests that the inclusion of video clips to *exaggerate* an aspect of the demonstrated procedure or to include an *unexpected event* in the procedural sequence may result in a negative learning effect, perhaps only serving to confuse the users or lead to an incorrect replication of the procedure in the laboratory with serious consequences. In order to enhance the procedural video sequences with the *Mindful Learning* ideas so far discussed our attention has turned to developing the interaction offered between the video elements (see

Mayer, 2001), exploring a reduction in video sequence duration without undue contraction of content, and in using incorrect procedural steps in a sequence as a means of procedural self-assessment.

Conclusions

The development of Langer's (1997) *Mindful Learning* ideas offered a starting point for the design and enhancement of a series of video sequences which serve to stimulate discussion between and offer procedural knowledge to a virtual community of radiopharmacists. Such production orientation sits in contract to the other production methods which centre exclusively on the video production of subject expert; such approaches may make little or no use of learning theories, subject to the composition of the production team. Taking a number of the ideas of *Mindful Learning* as a starting point has led us to consider a number of possible visual interpretations of those ideas to the realm of, in this example, radiopharmacy.

Our investigation so far indicates that the most effective visual interpretation of this theory is influenced by the objective of the video sequence and by the expectation of the user when coming to use the video sequence. Visual interpretations which may be effective in enhancing a video sequence for users with the aim of stimulating further discussion and raising attention may not be the most appropriate in enhancing a video sequence which requires precise replication of content by the users.

Our ongoing research into the ways in which learning theory can be used to enhance existing video sequences continues to draw on test examples within the community of radiopharmacists. Further research is also underway into the ways in which other theories of learning can be explored to influence visual practice in the design and enhancement of video materials for learning.

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Mike, Bob and Megan's Top Tips

1. **Video clip duration**: keep the duration as short as possible if the content is highly detailed and highly structured. Consider breaking a clip which is information heavy into two shorter clips.

2. **Learning theory interpretation**: consider different possible interpretations of the theory to video application. What may work in one medium may not easily translate to a video sequence production.

3. **Visual interpretation**: for any learning theory a number of visual interpretations may be available, the choice of which may be influenced by the nature of the content.

4. **Collect user views**: our exploration of Mindful Learning and the development of our ideas has benefited throughout by recording user reaction and comments, formally and informally.

5. **Appropriate timing:** Like good comedy, the enhancement of video materials may lie in the timing of each of its elements. Achieving an appropriate balance of elements to enhance learning appears to lie in considerate editing and production experience.